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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/537,290

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Taku Hirayama

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513 7590 12/15/2008

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EXAMINER

LEE, SIN J

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

12/15/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/537,290	<b>Applicant(s)</b> HIRAYAMA ET AL.	
	<b>Examiner</b> Sin J. Lee	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 16-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### ***Claim Rejections - 35 USC § 103***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 16-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gronbeck et al (US 6,803,171 B2) in view of Kodama et al (5,891,603).

Gronbeck teaches silsesquioxane-containing polymers suitable for use in bilayer resist systems (see col.3, lines 22-28). Specifically, in Example 30, Gronbeck teaches a terpolymer containing repeating units of phenylsilsesquioxane, hydroxybenzylsilsesquioxane and t-butoxycarbonato benzylsilsesquioxane (the t-butoxycarbonato group being a photoacid-labile ester group). Gronbeck teaches the equivalence of the photoacid labile ester group and a photoacid labile acetal group such

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as the one formed by grafting t-butylvinyl ether onto a phenolic hydroxyl moiety (see col.8, lines 44-64 and claim 2). Therefore, it would have been obvious to one skilled in the art to use a terpolymer having repeating units of phenylsilsesquioxane, hydroxybenzylsilsesquioxane and *t-butoxy* benzylsilsesquioxane as Gronbeck's polymer in his Example 30 with a reasonable expectation of obtaining a bilayer resist that has controlled dissolution rate with little or no loss of photospeed. Gronbeck's composition of Example 30 contains his terpolymer, a photoacid generator and a quencher. Gronbeck teaches coating his photoimageable composition onto a bottom layer (such as novolac polymer-based resist) which is applied onto a substrate (see col.23, lines 5-21). Gronbeck's photoimageable composition is then exposed and then developed (see col.23, lines 22-51). Gronbeck does not teach present (alkoxyphenylalkyl)silsesquioxane unit wherein the alkoxy group is linear with 1-4 carbon atoms.

Gronbeck's chemically-amplified resist is a two component system, which contains the silsesquioxane resin as described above and a photoacid generator. It is typically known in the art that one can either use two-component system (a resin having acid-decomposable group and a photoacid generator) or three-component system (*an alkali soluble resin*, a photoacid generator and a dissolution inhibitor) for a chemically amplified positive resist composition. See Kodama, col.2, lines 48-59. It would have been obvious to one skilled in the art to use a terpolymer having repeating units of phenylsilsesquioxane, hydroxybenzylsilsesquioxane and *an non-acid labile alkoxybenzylsilsesquioxane* (such as methoxy, ethoxy, propoxy or n-

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butoxybenzylsilsesquioxane instead of the acid labile t-butoxybenzylsilsesquioxane) as Gronbeck's polymer in his Example 30 together with a dissolution inhibitor with a reasonable expectation of success because it is *already known in the art* that one can interchangeably use two-component system (a resin having acid-decomposable group and a photoacid generator) or three-component system (an alkali soluble resin, a photoacid generator and a dissolution inhibitor) for a chemically amplified positive resist composition. Thus, Gronbeck in view of Kodama would render obvious present inventions of claims 16, 18-25 and 27-32.

With respect to present claims 17 and 26, Even though Gronbeck's polymer in Example 30 contains 5% phenylsilsesquioxane unit, Gronbeck also teaches that such unit can be present in the amount of 5, 10 or 20-30 or 40-50% based on total units of the polymer (see col.10, lines 22-37). Thus, it would have been obvious to one skilled in the art to use 10% of phenylsilsesquioxane unit in Gronbeck's polymer in his Example 30 with a reasonable expectation of obtaining a bilayer resist that has controlled dissolution rate with little or no loss of photospeed. Therefore, Gronbeck's teaching in view of Kodama also renders obvious present inventions of claims 17 and 26.

### ***Response to Arguments***

4. Applicants argue that Gronbeck do not teach or suggest the use of a dissolution inhibitor. Applicants argue that the *Examiner assumes* that the units of Formulas I to III of Gronbeck correspond to the units (a3), (a1) and (a2) of present invention. Applicants furthermore point out that R2 in Formula III of Gronbeck is an acid cleavable group which is not the case for present (a2) unit. First of all, the Examiner *never made such*

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*assumption*. The Examiner's position was (and still is) that it would have been obvious to one skilled in the art to use a terpolymer having repeating units of phenylsilsesquioxane, hydroxybenzylsilsesquioxane and *an non-acid labile alkoxybenzylsilsesquioxane* (instead of the acid labile t-butoxybenzylsilsesquioxane) as Gronbeck's polymer together with a dissolution inhibitor in his Example 30 with a reasonable expectation of success because *it is already commonly known in the art* that one can interchangeably use two-component system (a resin having acid-decomposable group and a photoacid generator) or three-component system (an alkali soluble resin, a photoacid generator and a dissolution inhibitor) for a chemically amplified positive resist composition. Applicants also argue that Kodama is not an analogous art because Kodama uses non-silicon resins. However, Kodama was cited merely to support the Examiner's position that *it is a common knowledge in the art* that one can interchangeably use two-component system (a resin having acid-decomposable group and a photoacid generator) or three-component system (an alkali soluble resin, a photoacid generator and a dissolution inhibitor) for a chemically amplified positive resist composition.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sin J. Lee/  
Primary Examiner, Art Unit 1795  
December 8, 2008